



DOI: <https://doi.org/10.38035/dit.v4i2>
<https://creativecommons.org/licenses/by/4.0/>

Received: 28 September 2026 | Revised: 05 October 2026 | Accepted: 10 October 2026

Development of Web Data Collaboration System at BAPPERIDA Bandung City

Nor Aisa Abdullah¹, Rini Suwartika²

¹Information Management, Politeknik Piksi Ganesha, Indonesia, noraisa.abdullah@msugensan.edu.ph

²Information Management, Politeknik Piksi Ganesha, Indonesia, rinisuwartika@gmail.com

Corresponding Author: noraisa.abdullah@msugensan.edu.ph¹

Abstract: BAPPERIDA Bandung City faces data loss risks due to manual research collaboration management. To address this issue, this study developed a web-based data collaboration system using the Waterfall model, modeled with UML and built upon PHP and MySQL. Black-box Testing and User Acceptance Testing (UAT) demonstrated that all functional features operated accurately with high user acceptance. Consequently, the system successfully establishes an efficient, transparent Single Source of Truth repository. Future development recommends integrating the platform with Laci RW and Natural Language Processing (NLP).

Keywords: BAPPERIDA, Collaboration, PHP, MySQL, Information Systems.

INTRODUCTION

Current developments in information technology require public governance to transform into digital platforms to increase service accuracy and speed. Effective data management is essential to guarantee data integrity and security (DAMA International, 2017), where the use of relational database systems such as MySQL facilitates precise and rapid data retrieval (Setyawati et al., 2020). However, BAPPERIDA Bandung City currently faces operational constraints due to research collaboration administration that is managed manually and fragmentedly using spreadsheets, creating risks of losing digital archives, sectoral silos and difficulty in historically tracking partnership activities.

The urgency of this research lies in the importance of valid research data at BAPPERIDA Bandung City as the foundation for formulating data-driven public policies (Kalaba, 2023). Without an integrated system, slow data consolidation risks hindering strategic decision-making. Prior research indicates that implementing integrated e-government can strengthen public participation structures and administrative efficiency (Adnan et al., 2022). The use of a PHP-based client-server architecture has also been proven to offer high flexibility in handling dynamic data management loads in the public sector (Tiwari et al., 2024).

The system developed in this study provides several solutions for BAPPERIDA. First, it applies the Single Source of Truth (SSOT) concept to eliminate data silos. Second, it provides real-time tracking features accessible to external partners to ensure public transparency. Third,

the use of open-source PHP and MySQL technologies offers optimal cost efficiency without burdening the regional budget (Silva et al., 2023).

The objectives of this study are to analyze the operational requirements for research collaboration data management at BAPPERIDA Bandung City, design and implement a centralized data collaboration system based on PHP and MySQL, and to evaluate the functionality and user acceptance level of the developed system.

Based on the background, the research questions of this study are:

1. How to transition the research collaboration data management system at BAPPERIDA Bandung City from manual to web-based?
2. How to design a centralized data collaboration system based on PHP and MySQL?
3. How to validate the functionality and level of user acceptance for the developed system?

METHOD

This study utilizes a descriptive qualitative approach (Hennink & Kaiser, 2022; Siiman et al., 2023) with asynchronous data collection methods using open-ended Google Form questionnaires and system guidebook in PDF format. This digital approach was selected so that staff at BAPPERIDA Bandung City could provide feedback without disrupting their operational activities. The qualitative approach focuses on gaining an in-depth understanding of phenomena through descriptive data, where combining narrative questionnaire results and document analysis aims to comprehensively formulate workflows and feature requirements.

System development was carried out sequentially and systematically using the Waterfall method, fitting the characteristics of public sector administration that requires structured planning and organized documentation at each phase (Kyeremeh, 2021; Saravanos & Curinga, 2023).

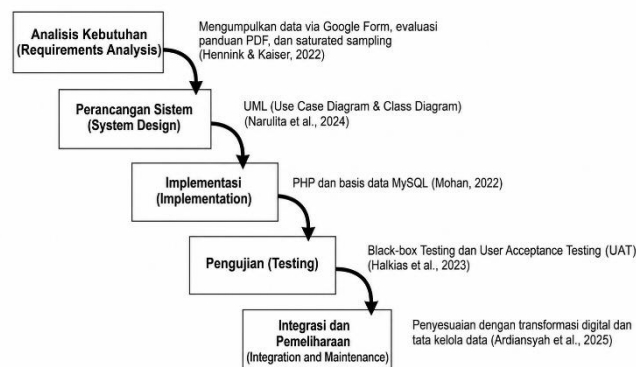


Figure 1. Conceptual Framework

The research stages were carried out systematically as follows:

1. **Requirements Analysis:** Collecting primary data asynchronously via Google Form questionnaires and feedbacks from BAPPERIDA Bandung City staffs using saturated sampling (Hennink & Kaiser, 2022).
2. **System Design:** Developing system architecture and database structures using the Unified Modelling Language (UML) to describe user interactions and integrated data structures (Narulita et al., 2024).
3. **Implementation:** Translating all designs into PHP programming language and MySQL database (Mohan, 2022).
4. **Testing:** Validating system functionality for logic errors through Black-box Testing (Arwin et al., 2023), as well as measuring the level of system acceptance and ease of use through User Acceptance Testing (UAT).
5. **Integration and Maintenance:** Ensuring the system runs stable within BAPPERIDA's operational environment and supports sustainable agency data governance (Ardiansyah et al., 2025).

To ensure the validity, credibility, and reliability of data, this study integrates a triangulation approach consisting of source triangulation, method triangulation, and empirical validation (Nurfajriani et al., 2024). Source triangulation utilized saturated sampling across all BAPPERIDA Bandung City staff to avoid bias. Method triangulation was conducted through open questionnaires and user guides. Meanwhile, empirical validation was tested directly through Black-box Testing for functional logic evaluation, as well as User Acceptance Testing (UAT) to measure user satisfaction levels.

RESULTS AND DISCUSSION

Result

The study resulted in the development of a web-based data collaboration information system for BAPPERIDA Bandung city. The system was modeled using Unified Modeling Language (UML) and implemented using PHP and MySQL. The developed system consisted of public and administrative interfaces and included features for collaboration data management, proposal and innovation submission, documentation upload, data search, filtering, and report export.

Use Case Diagram

The Use Case Diagram illustrates actor interactions with the system, which are divided into two primary roles: visitor and admin. Visitors can access the public dashboard, search for data, and view collaboration project details.

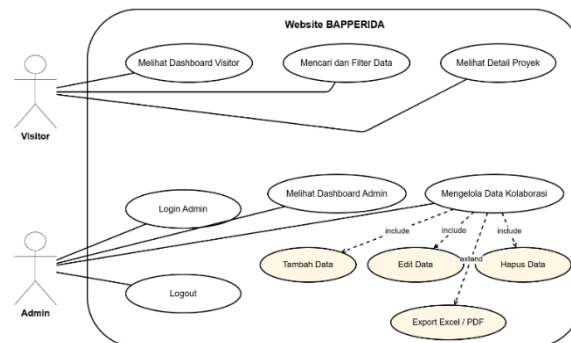


Figure 2. Use Case Diagram of BAPPERIDA Collaboration Information System

Meanwhile, admins have access permissions to login, manage collaboration data, upload documentation, export reports, and log out of the system. This separation of access privileges is implemented to maintain data security and transparency.

Activity Diagram

The Activity Diagram illustrates admins workflow within the system, starting with entering the username and password on the login page. If the credentials are invalid, the system displays an error message and redirects the admin back to the login page.

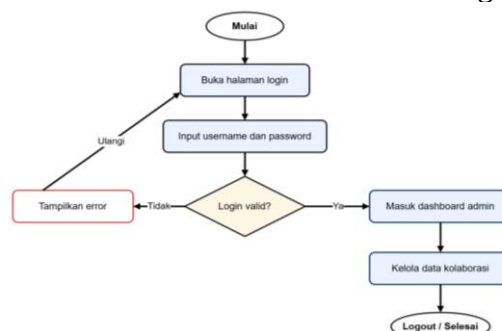


Figure 3. Activity Diagram of BAPPERIDA Collaboration Information System

Conversely, if validation succeeds, the admin is directed to the main dashboard. Through this dashboard, the admin has full access privileges to manage collaboration data before finally logging out to end the session.

Class Diagram

The class diagram shows the structure and relationships between components within the system. The system consists of four main classes: DatabaseConnection, which handles connections to the MySQL database; User, for admin authentication procedures; Kolaborasi, which handles project data management and KolaborasiHelper, to support file upload processes.

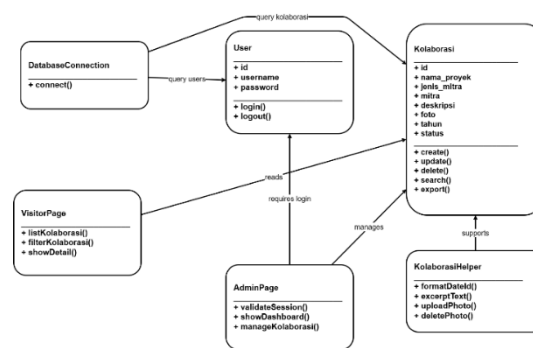


Figure 4. Class Diagram of BAPPERIDA Collaboration Information System

Designing this structure aims to facilitate structured system management development.

Database Implementation

The database in this system implements MySQL as the Relational Database Management System (RDBMS). The schema is structured to maintain data integrity while optimizing query search speed. This database structure includes three main tables:

1. Table users

Stores admin account credentials for system security and access control.

Table 1. Table users

Column Name	Data Type	Constraints	Description
id	INT(11)	Primary Key, Auto Increment	Unique user identity
username	VARCHAR(50)	Not Null, Unique	Admin login account name
password	VARCHAR(255)	Not Null	Encrypted account password
created_at	TIMESTAMP	Default CURRENT_TIMESTAMP	Account creation timestamp

2. Table kolaborasi

A centralized repository to store all partnership and research project information.

Table 2. Table kolaborasi

Column Name	Data Type	Constraints	Description
id	INT(11)	Primary Key, Auto Increment	Unique collaboration ID
nama_proyek	VARCHAR(255)	Not Null	Project title
jenis_mitra	VARCHAR(100)	Not Null	Partner category
nama_mitra	VARCHAR(200)	Not Null	Partner institution name
deskripsi	TEXT	Nullable	Detailed project summary

3. Table usulan_inovasi

A centralized repository to store all partnership and research project information.

Table 3. Table usulan_inovasi

Column Name	Data Type	Constraints	Description
id	INT(11)	Primary Key, Auto Increment	Unique proposal ID
nama_pengusul	VARCHAR(150)	Not Null	Proposer's name
instansi	VARCHAR(200)	Not Null	Institution
email	VARCHAR(100)	Nullable	Contact email
jenis_usulan	VARCHAR(100)	Not Null	Proposal type
judul_usulan	VARCHAR(255)	Not Null	Proposal title
wilayah_terkait	VARCHAR(200)	Nullable	District/sub-district location
deskripsi	TEXT	Not Null	Proposal description
status	VARCHAR(50)	Default 'Baru '	Proposal review status
tanggal	DATE	Not Null	Proposal submission date

Login Admin Sequence Diagram

The login Sequence Diagram illustrates the credential verification process for admins. The admin inputs a username and password, after which the system validates them against the database via the User class. If valid, the system created a session and displays the admin dashboard.

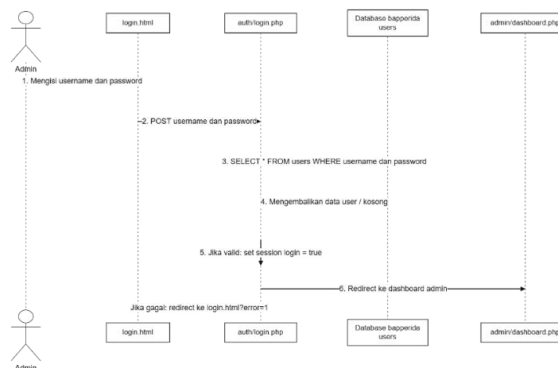


Figure 5. Sequence Diagram Login Admin

Otherwise, if the credentials do not match, the system displays a login error notification. This process is designed to ensure the security of system access privileges.

Collaboration Management Sequence Diagram

This diagram shows the collaboration data management process performed by the admin. Once the login session is verified, the admin can add, edit, or delete project data.

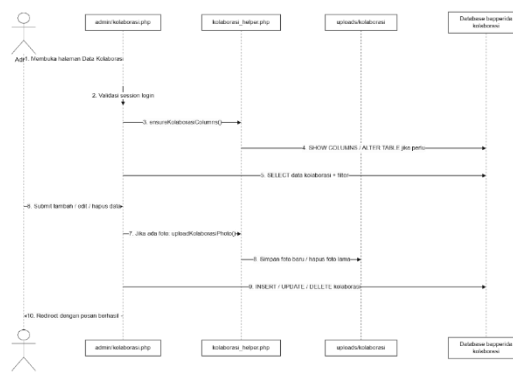


Figure 6. Sequence Diagram of Admin Managing Collaboration

The system then processes data and saves it into the MySQL database, including photo documentation uploaded via KolaborasiHelper.

Visitor Viewing Collaboration Details Sequence Diagram

This diagram depicts the flow when a visitor selects a collaboration project on the public page. The system retrieves data based on the project ID and displays detailed information to the user.

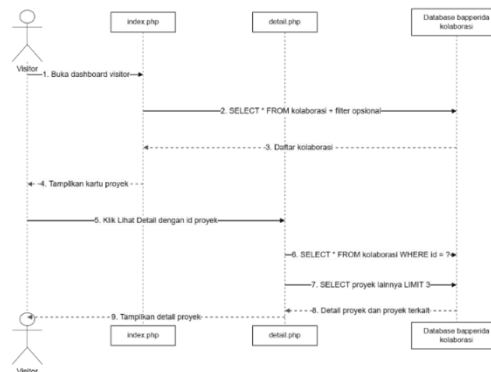


Figure 7. Sequence Diagram of Visitor Viewing Collaboration Details

In this process, visitors only have read-only access privileges, thereby maintaining data integrity.

Interface Implementation

The interface of the BAPPERIDA Bandung City data collaboration system is web-based, developed using the PHP programming language and MySQL database. The system is divided into two main interfaces: the admin page and the visitor page. The admin page is used to manage all collaboration data, proposals, and regional innovations, whereas the visitor page is used to openly display collaboration information to the general public and related partners.

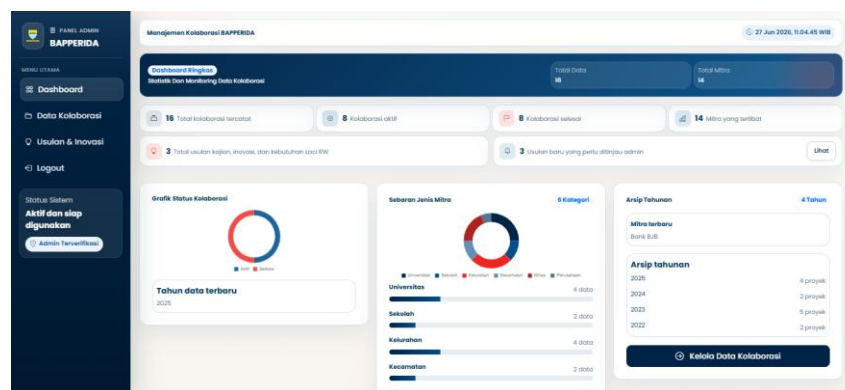


Figure 8. Collaboration Information System Admin Dashboard

The admin page provides a statistical dashboard, collaboration data monitoring, and primary management functions such as add, edit, delete, search, filter, data export, and project documentation upload. This page is also equipped with a Proposal & Innovation data management menu, which serves to accommodate new ideas, suggestions, and innovation initiatives from stakeholders. Meanwhile, the visitor page displays a list of active collaborations that can be searched and filtered by partner type, year, and status, allowing public users to obtain data more quickly and easily.

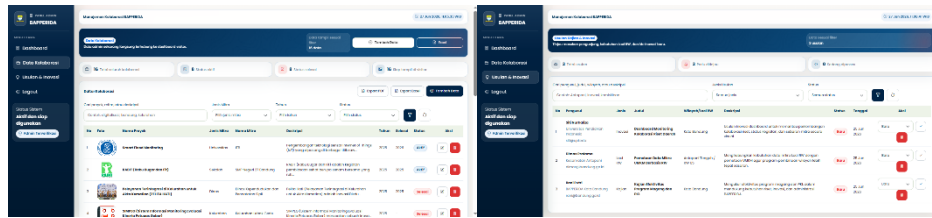


Figure 9. Collaboration Data Management and Proposal & Innovation Page

Additionally, the system features an admin login page as an authentication mechanism to restrict data management access privileges and ensure system security. Through this interface integration, collaboration data governance and innovation proposal administration become more centralized, structured, and efficient, while supporting public information transparency within BAPPERIDA Bandung City.

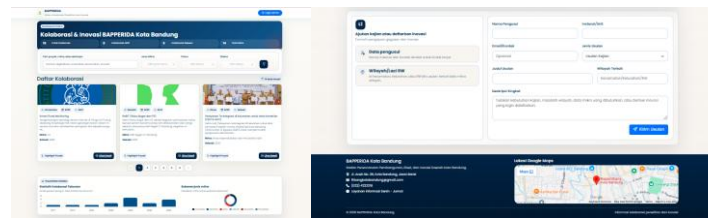


Figure 10. Visitor Dashboard

Black-box System Testing

System testing was conducted using the Black-box Testing method to ensure all system functions operate according to user requirements. Testing was performed on the login feature, collaboration data management, data search, project details, and logout.

Table 4. Black-box Testing

No	Feature	Expected Result	Status
1.	Admin Login	Admin successfully logs into the dashboard	Valid
2.	Collaboration Data Management	Data can be added, updated, and deleted	Valid
3.	Documentation Upload	Image files are successfully uploaded	Valid
4.	Data Search	The system displays data according to keywords	Valid
5.	Project Details	Project information displays correctly	Valid
6.	Logout	Admin successfully logs out of the system	Valid

The test results indicate that all system is capable of executing Create, Read, Update, and Delete (CRUD) operations validly and supporting public information access effectively. Based on the results, this web-based data collaboration information system is fit for implementation at BAPPERIDA Bandung City.

User Acceptance Testing (UAT) Results

User Acceptance Testing (UAT) was conducted to measure end-user acceptance and satisfaction levels with the web-based data collaboration system at BAPPERIDA Bandung City. The evaluation results showed highly positive feedback, with the admin login feature, data insertion, search system, and homepage clarity receiving the highest scores due to being user-friendly and accurate. Supporting features such as uploading documentation photos, status filtering, and completeness of project details were also evaluated as operating effectively in accordance with agency operational needs.

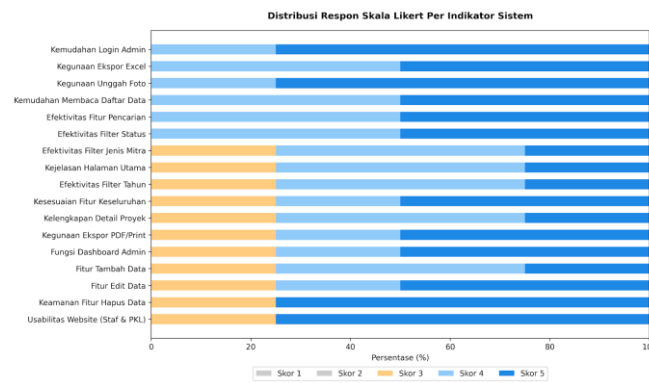


Figure 11. Questionnaire Results Chart via Google Forms

The UAT process was supported by distributing a digital guidebook in PDF format (bapperida-website-tutorial.pdf) to help staff learn the system efficiently. This guide is presented concisely and practically, complete with step-by-step screenshots ranging from login access to data management.

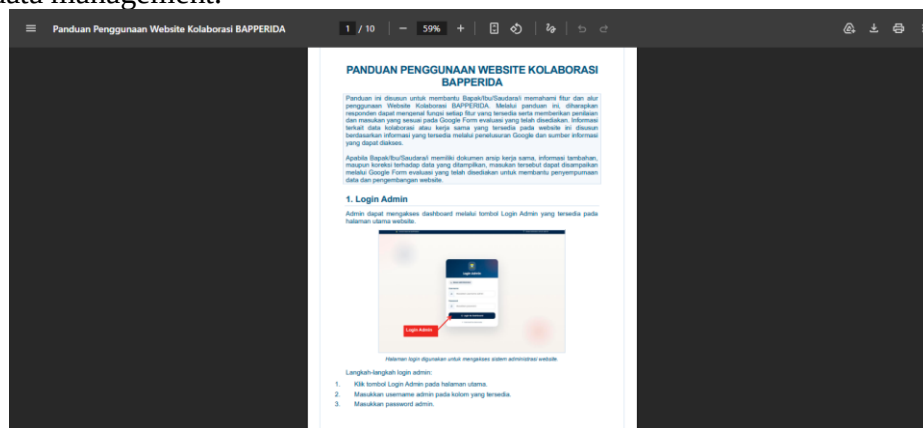


Figure 12. bapperida-website-tutorial.pdf

On the other hand, overall website usability, ease of reading data lists, and the Excel export functionality received relatively lower evaluation scores. Nevertheless, overall, the system was declared suitable for deployment, with recommendations for rearranging information layouts and optimizing document features in the next development phase.

Discussion

1. Difference Between Technical Functionality and End-User Experience

Although Black-box testing verified that all system features and database operations functioned with 100% accuracy, yet lower UAT scores in readability and Excel exports demonstrate that system reliability does not inherently guarantee optimal usability.

2. Role Based Governance and Centralization

Transitioning from fragmented spreadsheet tracking to implementing role differentiated web architecture directly addresses BAPPERIDA's operational vulnerabilities. Furthermore, implementing a Single Source of Truth (SSOT) balances security with public transparency.

3. Assessment Boundaries and Future Outlook

As evaluation was restricted to functional execution and user acceptance metrics, this study leaves long term organizational impacts unmeasured, underscoring the need for future longitudinal evaluations using Technology Acceptance Model (TAM).

CONCLUSION AND SUGGESTIONS

Conclusion

This study has successfully designed and developed the Web-Based Data Collaboration System at BAPPERIDA Bandung City using the PHP programming language and MySQL database. The implementation of this system has successfully transformed research collaboration data governance which was previously manual and fragmented into a centrally integrated system.

The user testing results obtained through User Acceptance Testing (UAT) with internal staff at BAPPERIDA Bandung City demonstrate that the system achieved a very high level of feasibility. Core features such as admin login, data entry, search functionality, and interface clarity were evaluated as accurate and user-friendly. In addition, all minor evaluation notes concerning interface usability and Excel document export features were rectified prior to full system deployment.

Limitations

Based on the limitations of previous studies, the novelty (state of the art) of this research lies in creating an integrated PHP and MySQL based web application tailored to BAPPERIDA Bandung City's regional innovation and partnership workflows. The platform resolves prior technical and functional constraints by incorporating administrator authentication, partnership data CRUD operations, photo uploading, searching/filtering, innovation proposal recording, and PDF/Excel exporting.

Recommendation

Based on feedbacks from BAPPERIDA Bandung City staff, future system development is expected to integrate directly with the local regional innovation platform, Laci RW, to expand territorial data mapping. Meanwhile, for future research recommendations, subsequent researchers are advised to evaluate long-term user adoption levels using the Technology Acceptance Model (TAM) framework, as well as apply Natural Language Processing (NLP) algorithms to automate the categorization of innovation proposals.

Author Contribution

The first author took primary responsibility for the research conceptualization, data collection, data analysis, and drafting of the manuscript. The second author contributed to the formulation of the conceptual framework, the interpretation of results, and the critical review and revision of the manuscript. Both authors have read and endorsed the final version of the article submitted for publication.

AI Disclosure Statement

While drafting this manuscript, the author used [Name of AI Tool/Service] for [purpose of use, e.g., grammar editing/translation]. The author has thoroughly reviewed and edited the content and takes full responsibility for the entire content of this publication. **(If using AI):**

The author declares that this research manuscript was prepared, researched, written, and edited independently without the use of artificial intelligence (AI) technology or techniques. **(If NOT using AI):**

Acknowledgment (Optional)

The authors would like to express their appreciation and gratitude to all respondents who participated and provided valuable information during the data collection process of this study. Thanks, are also extended to the café customers in Jambi City who contributed to the success of this research. Furthermore, the authors acknowledge all parties who provided support, input, and motivation throughout the preparation of this study.

REFERENCES

- Adnan, M., Ghazali, M., & Othman, N. Z. S. (2022). E-participation within the context of e-government initiatives: A comprehensive systematic review. *Telematics and Informatics Reports*, 8, 100015. <https://doi.org/10.1016/j.teler.2022.100015>
- Ardiansyah, M. M., Chilmy, K., & Wildan, M. A. (2025). Studi kualitatif: Praktik manajemen sumber daya manusia terhadap inovasi di sektor publik Kabupaten Gresik. *Journal of Management and Creative Business*, 3(1), 171-189. <https://doi.org/10.30640/jmcbus.v3i1.3559>
- Arwin, D., Dyahayu, & Adinata, H. R. (2023). Measuring information system-based village administration service performance using boundary value analysis techniques. *Journal of Informatics and Telecommunication Engineering*, 6(2). <https://doi.org/10.31289/jite.v6i2.8235>
- DAMA International. (2017). DAMA-DMBOK: Data Management Body of Knowledge (2nd ed.). Technics Publications. <https://www.issa.int/node/283565>
- Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292, 114523. <https://doi.org/10.1016/j.socscimed.2021.114523>
- Jopang, J., Aryatama, S., Muazzinah, M., Qamal, Q., & Ansar, A. (2024). Exploring the relationship between e-government, transparency, and citizen trust in government services. *Global International Journal of Innovative Research*, 2(6), 1354-1363. <https://elibrary.ru/item.asp?id=74379073>
- Kalaba, C. J. (2023). Data-Driven Decision-Making in Local Governments: A Case Study of a Zambian Municipality (PhD diss., MA Thesis, Stellenbosch University). <https://scholar.sun.ac.za/bitstreams/155ca48a-c400-4a34-b299-cba84d85ad5c/download>
- Kyeremeh, K. (2021). Overview of system development life cycle models. *Journal of Management and Science*, 11(1), 12-21. <https://doi.org/10.26524/jms.11.3>
- Mohan, V. (2022). System development life cycle. In *Clinical Informatics Study Guide: Text and Review* (pp. 177-183). Springer International Publishing. https://doi.org/10.1007/978-3-030-93765-2_12
- Narulita, S., Nugroho, A., & Abdillah, M. Z. (2024). Diagram Unified Modelling Language (UML) untuk perancangan sistem informasi manajemen penelitian dan pengabdian masyarakat (SIMLITABMAS). *Bridge: Jurnal Publikasi Sistem Informasi dan Telekomunikasi*, 2(3), 244-256. <https://doi.org/10.62951/bridge.v2i3.174>
- Nurfajriani, W. V., Ilhami, M. W., Mahendra, A., Afgani, M. W., & Sirodj, R. A. (2024). Triangulasi data dalam analisis data kualitatif. *Jurnal Ilmiah Wahana Pendidikan*, 10(17), 826-833. <http://jurnal.peneliti.net/index.php/JIWP/article/view/7892>
- Saravanos, A., & Curinga, M. X. (2023). Simulating the software development lifecycle: The waterfall model. *Applied System Innovation*, 6(6), 108. <https://doi.org/10.3390/asi6060108>
- Setyawati, E., Sarwani, Wijoyo, H., & Soeharmoko, N. (2020). Relational Database Management System (RDBMS). CV. Pena Persada. https://www.researchgate.net/publication/344806128_RELATIONAL_DATABASE_MANAGEMENT_SYSTEM_RDBMS
- Siiman, L. A., Rannastu-Avalos, M., Pöysä-Tarhonen, J., Häkkinen, P., & Pedaste, M. (2023). Opportunities and challenges for AI-assisted qualitative data analysis: An example from collaborative problem-solving discourse data. In *Innovative Technologies and Learning* (pp. 87-96). Springer. https://doi.org/10.1007/978-3-031-40113-8_9
- Silva, D. G., Coutinho, C., & Costa, C. J. (2023). Factors influencing free and open-source software adoption in developing countries—an empirical study. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(1), 100002. <https://www.sciencedirect.com/science/article/pii/S2199853123000021>

Tiwari, V., Varshney, M., Singh, K. P., & Bharti, S. K. (2024). A comparative study of MVC architecture model of open-source server-side scripting language JSP and PHP for client-server architecture-based applications development. *International Journal of Engineering Technology Management Science*, 8(1). <https://doi.org/10.46647/ijetms.2024.v08i02.019>